

CLAIMS

1. A chemical conversion coating agent comprising:
at least one kind selected from the group consisting of
5 zirconium, titanium and hafnium;
fluorine; and
an adhesion and corrosion resistance imparting agent;
wherein said adhesion and corrosion resistance imparting
agent is at least one kind selected from the group consisting
10 of:
 - 1 to 5000 ppm (metal ion concentration) of at least one
kind of metal ion (A) selected from the group consisting of zinc
ion, manganese ion and cobalt ion;
 - 1 to 5000 ppm (metal ion concentration) of alkaline earth
15 metal ion (B);
 - 1 to 5000 ppm (metal ion concentration) of metal ion (C)
of Group III in the periodic table;
 - 0.5 to 100 ppm (metal ion concentration) of copper ion
(D); and
- 20 1 to 5000 ppm (as a silicon component) of a
silicon-containing compound (E).

2. The chemical conversion coating agent according to
Claim 1,
 - 25 wherein the alkaline earth metal ion (B) is at least one
kind selected from the group consisting of magnesium ion, calcium
ion, barium ion and strontium ion,
the metal ion (C) of Group III in the periodic table is
at least one kind selected from the group consisting of aluminum
30 ion, gallium ion and indium ion, and
the silicon-containing compound (E) is at least one kind
selected from the group consisting of silica, water-soluble
silicate compounds, esters of silicic acid, alkyl silicates,
and silane coupling agents.

3. The chemical conversion coating agent according to
Claim 1 or 2, containing

1 to 5000 ppm of at least one kind of a chemical conversion
reaction accelerator selected from the group consisting of
5 nitrite ion, nitro group-containing compounds, hydroxylamine
sulfate, persulfate ion, sulfite ion, hyposulfite ion, peroxides,
iron (III) ion, citric acid iron compounds, bromate ion,
perchlorinate ion, chlorate ion, chlorite ion, as well as
ascorbic acid, citric acid, tartaric acid, malonic acid, succinic
10 acid and salts thereof.

4. A surface-treated metal comprising
a chemical conversion coat formed by the chemical
conversion coating agent according to any of Claims 1 to 3 on
15 a surface thereof.

5. The surface-treated metal according to Claim 4,
wherein the chemical conversion coat has a coat amount
of 0.1 to 500 mg/m² in a total amount of metals contained in
20 the chemical conversion coating agent.